WHAT IS CLAIMED IS:

1. A power amplifier module comprising:

an amplifier; and

a control circuit for supplying the amplifier with an idling current that controls the output power of the amplifier,

wherein the control circuit receives input control voltage and makes the idling current behave so as to exponentially change, relative to the input control voltage.

2. The power amplifier module according to claim 1, wherein the control circuit including:

a circuit for converting the input control voltage into current;

a circuit for generating a reference voltage from the current into which the input control voltage has been converted and setting a gradient of voltage that changes in proportion to the input control voltage; and

a circuit for converting the voltage into the idling current that changes exponentially.

3. The power amplifier module according to claim 1, wherein the amplifier is a complex comprising a plurality

of stages of amplifiers connected in tandem, and wherein the control circuit is a complex comprising a plurality of circuits that receive the control input voltage in common and separately supply the idling current to one of the plurality of stages of amplifiers.

4. The power amplifier module according to claim 3, wherein a common circuit is formed, comprising the circuit for converting the input control voltage into current, the circuit for generating a reference voltage from the current into which the input control voltage has been converted and setting a gradient of voltage that changes in proportion to the input control voltage, and the circuit for converting the voltage into the idling current that changes exponentially, and

wherein a plurality of circuits are provided for supplying the idling current to the plurality of stages of amplifiers such that each circuit serves each stage of amplifier with the idling current.

5. The power amplifier module according to claim 1, wherein the amplifier is fabricated with GaAsHBTs packaged on a semiconductor integrated circuit including a pair of an input transistor and an output transistor, the input transistor carrying the idling current and forming a current

mirror circuit in conjunction with the output transistor, and

wherein the control circuit is fabricated with Si transistors or GaAsHBTs packaged on a semiconductor integrated circuit.

6. The power amplifier module according to claim 1,

wherein the amplifier is fabricated with SiGeHBTs or Si bipolar transistors packaged on a semiconductor integrated circuit including a pair of an input transistor and an output transistor, the input transistor carrying the idling current and forming a current mirror circuit in conjunction with the output transistor, and

wherein the control circuit is fabricated with SiGeHBTs or Si bipolar transistors packaged on a semiconductor integrated circuit.

7. The power amplifier module according to claim 1,

wherein the power amplifier module further includes a circuit for limiting the idling current once the input control voltage has reached a predetermined level.

8. The power amplifier module according to claim 1,

wherein the power amplifier module further includes a circuit by which the temperature characteristic of the idling current can be set optionally.

9. The power amplifier module according to claim 2,

wherein the amplifier is a complex comprising a plurality of stages of amplifiers connected in tandem, and

wherein the control circuit is a complex comprising a plurality of circuits that receive the control input voltage in common and separately supply the idling current to one of the plurality of stages of amplifiers.

10. The power amplifier module according to claim 9, wherein a common circuit is formed, comprising the circuit for converting the input control voltage into current, the circuit for generating a reference voltage from the current into which the input control voltage has been converted and setting a gradient of voltage that changes in proportion to the input control voltage, and the circuit for converting the voltage into the idling current that changes exponentially,

wherein a plurality of circuits are provided for supplying the idling current to the plurality of stages of amplifiers such that each circuit serves each stage of amplifier with the idling current.

11. The power amplifier module according to claim 2, wherein the amplifier is fabricated with GaAsHBTs packaged on a semiconductor integrated circuit including a pair of an input transistor and an output transistor, the input transistor carrying the idling current and forming a current mirror circuit in conjunction with the output transistor, and

wherein the control circuit is fabricated with Si transistors or GaAsHBTs packaged on a semiconductor integrated circuit.

12. The power amplifier module according to claim 2, wherein the amplifier is fabricated with SiGeHBTs or Si bipolar transistors packaged on a semiconductor integrated circuit including a pair of an input transistor and an output transistor, the input transistor carrying the idling current and forming a current mirror circuit in conjunction with the output transistor, and

wherein the control circuit is fabricated with SiGeHBTs or Si bipolar transistors packaged on a semiconductor integrated circuit.

13. The power amplifier module according to claim 3, wherein the power amplifier module further includes a

circuit for limiting the idling current once the input control voltage has reached a predetermined level.

14. The power amplifier module according to claim 2, wherein the power amplifier module further includes a circuit by which the temperature characteristic of the idling current can be set optionally.